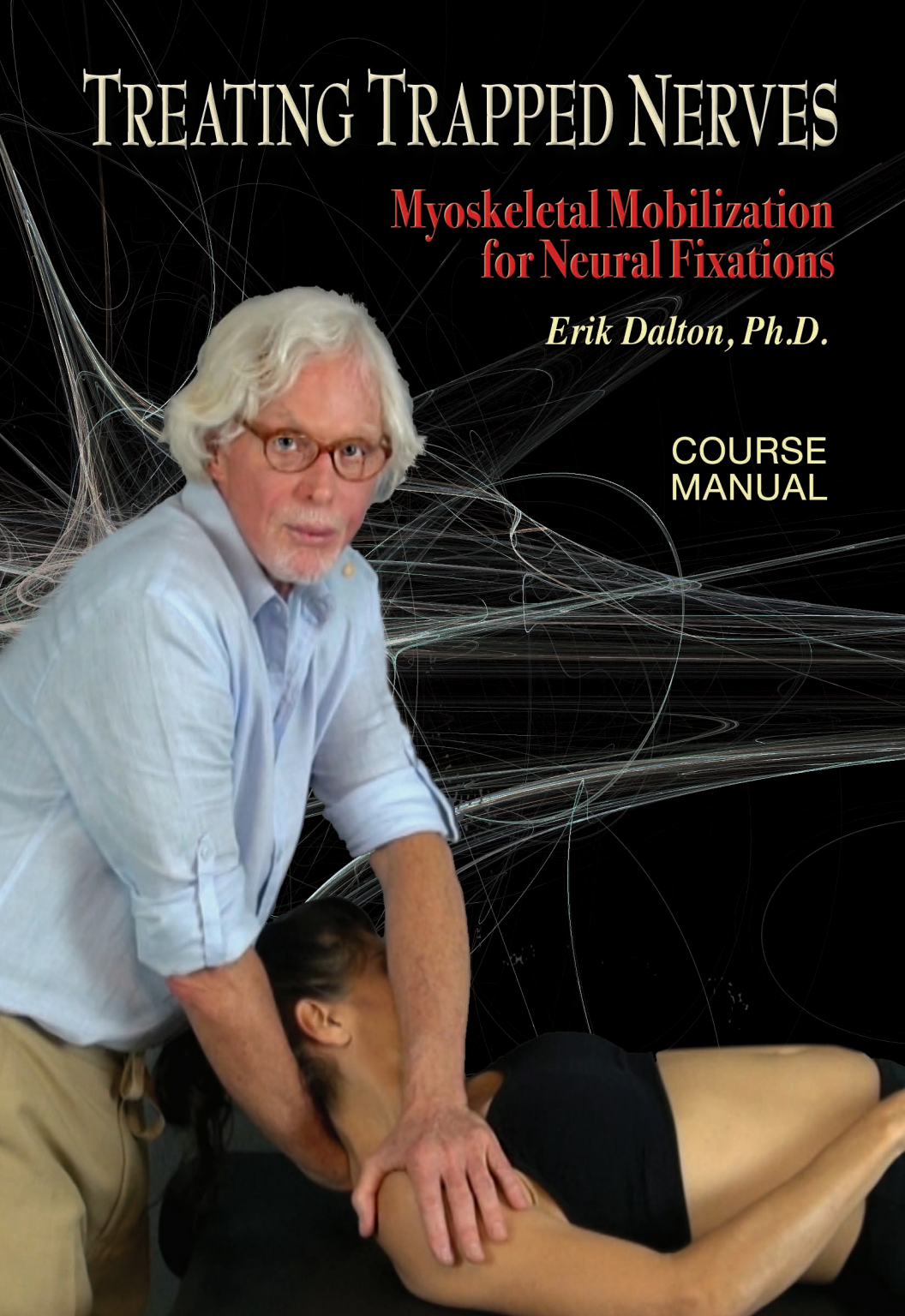
TREATING TRAPPED NERVES

Myoskeletal Mobilization for Neural Fixations

Erik Dalton, Ph.D.

COURSE MANUAL



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First Edition

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Supplemental Reading

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PREFACE

The concept of neuromobilization was originally based on research by physiotherapists, Geoffrey Maitland, Michael Shacklock and David Butler. Over the years, other researchers have added to the volume of scientific literature supporting the hypothesis that nerves require unimpeded movement for full pain-free function.

According to Michael Shacklock, "The entire nervous system is a continuous structure. It moves and slides in the body as we move and the movement is related to critical physiological processes such as blood flow to neurons. This movement is quite dramatic and it is not hard to imagine that fluid such as blood in the nerve bed, a constricting scar, inflammation around the nerve or a nerve having to contend with arthritic changes or proximity to an unstable joint could have damaging effects, some of which could lead to pain."

Acute compression of a normal peripheral nerve doesn't necessarily produce symptoms such as pain, but the client may experience nocturnal numbness, motor weakness, and related symptoms. So be it with nerve root lesions. Mechanical entrapment of a normal spinal nerve root may initiate similar sensory and motor impairment in the complete absence of pain. However, mechanical factors that induce intraneural nerve root edema may lead to hyperexcitability, protective muscle spasm, fibrosis and pain. For example, it has not been shown that lumbar nerve root compression necessarily causes leg pain or neurologic dysfunction, but in the presence of prolonged compression of neural and perineural tissues, an inflammatory response may trigger chemo and nociceptor hyperexcitability causing the brain to react with a pain response.

Bones Dominate, Muscles Accommodate & the Brain Regulates

The mechanosensitivity of neural tissues is affected by altered joint position and reflexive muscle spasm. When muscles and joints entrap and injure a nerve, the brain may try and protect the area through chronic inflammation and adhesive scar tissue formation. The word mobilization is loosely used to describe the various kinds of manual therapy treatment techniques and many are helpful in cases of neural entrapment. When combining soft tissue mobilization modalities such as massage, active isolated stretching, and muscle energy with gentle joint mobilization maneuvers such as traction and gliding, the benefit is mobilization of the nervous system. The Myoskeletal goal is to relieve pain and protective spasm while restoring pain-free functional movement.

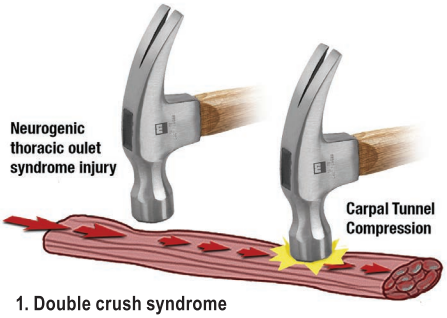
The good news is that the techniques in this "Treating Trapped Nerves" home-study course can show you how to release painful neural entrapments and restore pain-free movement. Success requires that the therapist perform an accurate assessment and apply specific treatment to the entrapment site perpetuating the adverse neural tension. By combining joint stretching, soft tissue work and nerve mobilization maneuvers, you will quickly be able to normalize movement and provide nerve pain relief. Often this nerve pain relief is instantaneous!

I hope you enjoy this course - In Touch

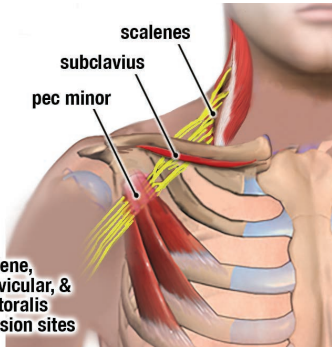
Erik Dalton

Double Crush Nerve Damage

The term double crush syndrome (DCS) was coined by Harvard University plastic surgeons Albert Upton and Alan McComas, who wrote, "Neural function is impaired when compressed axons at one site cause the nerve to become especially susceptible to damage at another site" (Image 1). Their double crush research began after observing that many carpal, cubital, and radial tunnel patients also complained of unilateral shoulder, chest, and upper back pain.[1]



1. Double crush syndrome



2. Interscalene, costoclavicular, & retropectoralis compression sites

While the DCS mechanism is not completely understood, it likely involves nerve sensitization and neuroplastic changes in the pain-modulating systems of the brain and spinal cord.

Neural compression of the brachial plexus is suitably called neurogenic thoracic outlet syndrome (NTOS). These clients present with a variety of symptoms, including painless atrophy of intrinsic hand muscles and nighttime paresthesia. Athletes may have difficulty grasping a racquet or ball, and some report pain. However, I've found that rather than being a main pain event, NTOS is more of an enhancer of symptoms at a distal site, such as the carpal tunnel. Put simply, the brain pays more attention to double crush nerve insults and is more likely to respond with pain or spasm.

Although most clinicians feel that NTOS is an underestimated cause of DCS, assessment is often difficult due to vague, fluctuating symptoms. Instead of chasing the pain, I've achieved superior outcomes by palpating and releasing all fibrous connective tissue sites that may be kinking, stretching, or inflaming the brachial plexus. Now, we'll palpate and release NTOS contractures at the interscalene triangle, costoclavicular canal, and retropectoralis minor spaces (Image 2).

3. Interscalene Triangle: (A)With the clients head left-rotated, my soft-cupped fingers wade behind the sternocleidomastoid and onto the scalene attachements at the transverse processes. (B) By left-rotating and slowly extending the client's neck, I palpate for scalene adhesions and pin stretch to release.

INTERSCALENE IMPINGEMENT

Nerve fibers originating at the spinal cord travel from the neck, through the thoracic outlet, and into the hand, providing sensation and movement during daily tasks. Certain postures or sleeping positions may increase tension and pressure on entrapped nerves.

4. Subclavius stretch: The client's arm rests on my shoulder, and my right hand's curled fingers snake behind the clavicle and brace while my left fingers wade in front of the upper trapezius and contact the scalenes where they attach to the first rib. To create space and stretch the subclavius, I simply extend my knees and abduct her arm, allowing my fingers to spread open the thoracic outlet.

Further complicating the nerve's journey through the thoracic outlet, researcher David B. Roos, MD, FACS, discovered irregular fibrous bands that increased brachial plexus stiffness and decreased movement.[2] Roos classified 10 types of contractures that can stiffen the already unforgiving boundaries of the thoracic outlet container. Despite all the neural roadblocks, it has been my experience that many DCS clients respond well to massage, movement, and any type of cognitive training that lowers the brain's threat level during movement. In Image 3, I demonstrate my favorite anterior and middle scalene stretch to create space at the interscalene triangle.

SUBCLAVIUS AND THE COSTOCLAVICULAR CANAL

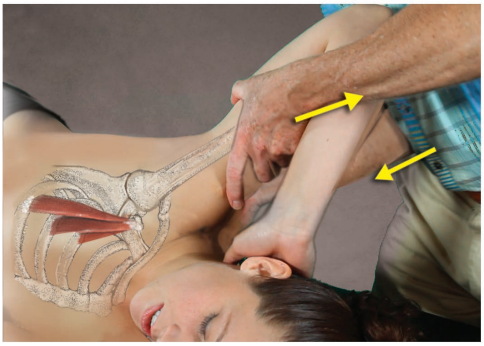
In clients with a drooping clavicle, the underlying subclavius muscle can reduce the costoclavicular canal size and compress the brachial plexus against the first rib. Upper chest breathing can exacerbate the problem, as the first rib elevates during inhalation and can get stuck there. A 2015 study published in BMC Research Notes also noted brachial compression from the subclavius posticus muscle, which ties the first rib to the superior border of the scapula.[3] Rather than dig in to the sensitive tissues under the clavicle, I always begin with the subclavius stretch demonstrated in Image 4. This slow, gentle, graded exposure stretch is designed to reassure the brain that it's now safe to move in previously painful positions.

RETROPECTORALIS MUSCLE IMPINGEMENT

Repetitive movements of the arms above the head, common among tennis enthusiasts, may cause friction and overstretch the nerve plexus under the pectoralis minor at the coracoid. The least irritating way I've found to create space here is by stretching the distal fibers that attach to ribs 3,

4, and 5. Notice in Image 5 that the stretch is directed at a 135-degree angle, which is the approximate pectoralis muscle fiber angle from coracoid to the rib insertions.

Many NTOS studies recommend postural correction, including muscle strengthening and lengthening for double crush complaints. However, there is no consensus in the literature as to exactly which muscles should be targeted. Posture is dynamic and the best results are gained through whole-body strengthening and balancing programs such as swimming, yoga, and martial arts. The bodywork goal is to bring mental awareness to areas of restriction and to teach the client it is safe to move through those previously painful barriers.



5. Pectoralis minor: With the client's hand resting on her neck, my left hand grasps her arm, and my right palm braces her scapula. As she inhales and gently pulls her elbow toward the therapy table, I resist to a count of five. Upon exhalation, a counterforce is created as I pull with my left hand and brace with my right hand, feeling for a stretch in the pectoralis minor fibers at ribs 3, 4, and 5.

Notes:

1. A. R. Upton and A. J. McComas, "The Double Crush in Nerve Entrapment Syndromes," Lancet 2, no. 7825 (August 1973): 359–62.
2. D. B. Roos, "The Thoracic Outlet Syndrome is Underrated," Archives of Neurology 47, no. 3 (1990): 327–28.
3. J. Muellner et al., "Neurogenic Thoracic Outlet Syndrome Due to Subclavius Posticus Muscle with Dynamic Brachial Plexus Compression: A Case Report," BMC Research Notes 8, no. 351 (August 2015). doi:10.1186/s13104-015-1317-3.

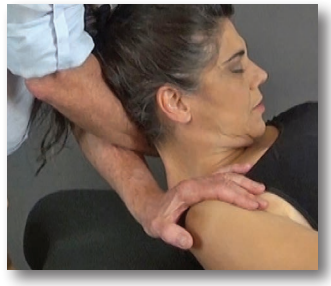
TECHNIQUE TIPS

Some of these techniques may be unfamiliar, but with practice they will become second nature. As you work, keep the following things in mind:

- **Pain is a perception of the brain**, and your goal is to make the brain happy.
- The client should be positioned on the table to allow complete relaxation.
- Reassure the client that she has come to the right place and that everything is all right… right now.
- **The force applied should not create neurogenic pain.**
- Think function when performing deep myofascial work… does this body segment require restoration of extensibility, or contractibility?
- Visualize the osseous and neural anatomy beneath your fingers.
- Think of bone as soft tissue. Make it a natural progression to palpate and treat osseous structures as you move through the deep myofascia.
- Work at the client's restrictive barrier but don't bulldoze the barrier.
- Position your body so that you can relax and stay strong.
- Keep your own pelvis and shoulder girdle in alignment. **Effective deep tissue work requires low shoulders, locked-in lumbar lordosis, and force coming from the ground.**
- Use enhancers such as arm movement, deep breathing and other movement cues to restore better function.
- Choose the right tool for the job. If the tissue demands more force, move from fingers to fists or to elbows.
- Think alignment, balance, range of motion, and function. Don't get caught in the "fix-it" trap.
- Don't begin treatment without a plan.... ***don't chase the pain!***

LESSON 1

1. Nerve Root Test & Stretch



GOAL: Test & stretch cervical nerve roots

LANDMARK: Upper Body

A. Cross-armed Stretch (Client Supine)

- Therapist slides dominant arm under client's neck and places it on client's anterior left shoulder
- Therapist slides left arm under right shoulder so that his left hand contacts client's anterior right shoulder
- As therapist slowly straightens his legs, while maintaining bilateral pressure with both arms, client's head is slowly flexed to the first restrictive barrier

Repeat 3 to 5 times and reassess for improvement

B. Sidebending / rotation nerve mobilization

- Therapist removes left hand from client's shoulder allowing his right arm to form a fulcrum to comfortably support client's head and neck
- Therapist's left hand grasps client's forehead and slowly begins to left sidebend and left rotate client's head to stretch levator scapula and splenius cervicis

Repeat 3 to 5 times and reassess for improvement

C. Scalene nerve stretch

- Therapist's right hand slowly right rotates and left sidebends client's neck to first restrictive barrier using a counterforce between left hand and right forearm. Repeat on opposite side

Repeat 3 to 5 times and reassess for improvement

D. Head roll to test nerve mobility

- Therapist's left hand initiates a counter-clockwise circular rolling motion using his right forearm as a fulcrum
- After completing three large circles, therapist moves right hand from client's shoulder and both hands grasp and lower client's head to the therapy table
- Therapist grasps client's neck leans his body weight back and gently decompresses client's neck left upper traps and SCM

Repeat 3 to 5 times and reassess for improvement

E. Intertransversarii Stretch

GOAL: Relieve nerve root, trunk, and cord compression of brachial plexus.

LANDMARK: Intertransversarii, thoracic outlet, costoclavicular canal, and pectoralis minor.

ACTION: Stretch cervical intertransversarii muscles

- Therapist standing at head of therapy table grasps and slowly right rotates client's head to barrier.
- Therapist gently lifts clients head/neck to first flexion barrier.
- Client inhales to a count of 5 and gently extends head back toward the table against therapist's resistance.
- As client exhales, therapist slowly and gently lifts rotated head to next flexion barrier.

Repeat 5 times, left rotate client's head and repeat procedure and assess for degree of improvement.

Note: *Very little effort is needed to successfully perform this powerful stretching technique due to the size of the intertransversarii muscles so be cautious during rotation and flexion efforts. Discontinue if any discomfort is experienced by client.*

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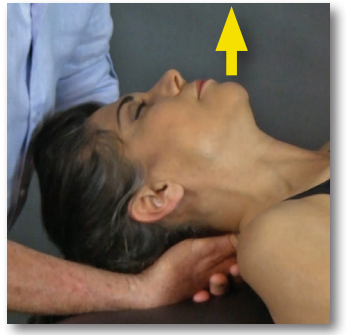
2. Neck Cricks

A. Chin-Jutting Nerve Mobilization



GOAL: Restore cervical curve - mobilize nerve roots

LANDMARK: Cervical lamina groove (client supine)

ACTION:

- Therapist places back side of dominant hand into flat palm of his non-dominant hand and lifts client's head and neck so they rest on the therapy table
- Therapist brings thumbs ½ inch apart and places them into the lamina groove on either side of the spinous processes
- Therapist gently mobilizes client's neck by pushing up with both thumbs into the groove
- The rhythmic action juts the client's chin as each vertebral segment C2-3 to C7-T1 are extended over the thumb fulcrum

Repeat the chin-jutting for 2 minutes and reassess for increased mobility

B. Sidebending

GOAL: Nerve root mobilization

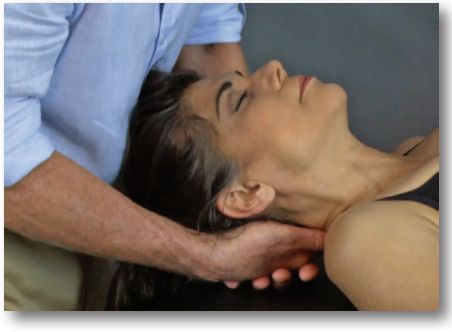
ACTION:

- Therapist's cupped palms support client's head as both thumbs pin the lateral body of the C-5 spinous process (SP).
- Therapist right sidebends client's neck while right thumb presses against the side of the SP. This creates a fulcrum at C-5 that tests the mobility of the joint capsule.
- Therapist repeats by sidebending left and pushing with left thumb & repeat.
- If a right sidebending restriction is found as the therapist examines up and down the cervical spine, client inhales and gently left sidebends head against therapist's resistance to a count of five and relaxes.
- Therapist right sidebends client's neck to new restrictive barrier.

Repeat the maneuver until a release is felt in fibrotic capsule and ligaments
(Perform this technique bilaterally from C-2 to T-1)

Note: *This is a myofascial release technique. By bracing C-5 with right thumb during right sidebending efforts, the therapist can determine if C-5 is moving properly on C-6. If resistance to right sidebending is felt when client's neck is in flexion, the C5-6 facet joint on client's left is not opening. If resistance to right sidebending at C5-6 is encountered with client's head in extension, the C5-6 facet joint on the right is not closing. Demo these techniques on a plastic spine if possible.*

C. Translation / Undulation



GOAL: Nerve root mobilization

ACTION:

- Therapist's thumbs face inferiorly and brace each side of client's spinous processes
- As therapist steps to his left foot, his right thumb pushes against the spinous processes. As he steps to his right foot, his left thumb presses on the spinous processes.
- Therapist begins a rhythmic undulating motion as he rocks back and forth foot-to-foot, pushing on bodies of the spinous processes

Therapist examines for motion restricted tissues from C-2-3 to C 7-T1. and reassesses for improved mobility

3. Scalene nerve entrapment

GOAL: Create space in interscalene triangle

LANDMARK: Interscalene triangle

A. Anterior scalenes

ACTION:

- With clients head left rotated, therapist's soft finger pads glide along client's lateral neck and come under the clavicular border of SCM
- Therapist's finger pads gently glide up onto the anterior scalene attachments on the client's transverse processes (C2-C6)
- Client's head is rotated back to neutral and she is asked to inhale and exhale so therapist's fingers can assess for tightness
- Therapist's fingers pin and scrub the scalene attachments up and down the neck
- Client performs slow chin tucks as therapist holds anterior scalene attachments

Repeat 5 times and reassess for improved mobility

B. Medial (middle) scalene

ACTION:

- Therapist right rotates client's head to allow his thumb to gently contact the client's middle scalene muscle
- Therapist's thumb stretches the middle scalene attachment as client slowly inhales and exhales

Repeat 5 times and check for improved tissue mobility

Note: *Soft finger pads can be used instead of thumbs*

4. Costoclavicular canal subclavius entrapment

GOAL: Release subclavius to create space in costoclavicular canal

LANDMARK: Below clavicle

ACTION:

- Therapist's left hand grasps client's right wrist
- Therapist walks to opposite side of the table
- Therapist lifts client's clavicle (shoulder) by pulling on her arm

- Therapist pronates his right wrist to allow his soft finger pads to glide gently under client's clavicle
- Therapist scrubs the subscapularis muscle by pulling with his left hand while his finger pads scrub medial to lateral under the clavicle

Repeat 5 times and reassess for improved mobility

5. Costoclavicular canal 1st rib entrapment

GOAL: Assess for elevated first rib & tight scalenes

ACTION:

- Therapist's right arm crosses under client's armpit and fingers contact first rib.
- Therapist's left hand sidebends client's head left and rotates right to barrier
- Client inhales while gently sidebending head right against therapist's resistance and relaxes
- Therapist's fingers secure first rib while bringing client's head into more left sidebending and rotation

Repeat steps above and reassess for improved mobility

6. Retropectoralis minor nerve entrapment

A. Bilateral elbow pec release

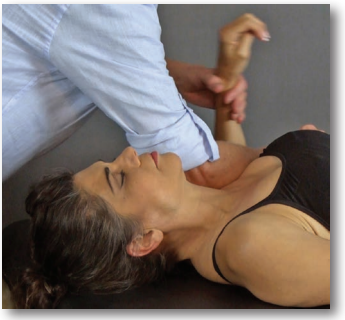
GOAL: Create brachial plexus space

LANDMARK: Chest Wall

ACTION: Bilateral elbow pec release

- Therapist's elbows hook pec fascia and move tissue laterally to open up front line
- With client's arms abducted to 135º, she begins externally and internally rotating her arms

Repeat 2 - 3 minutes and assess for improved shoulder rotation



B. Unilateral elbow pec release

ACTION:

- Therapist grasps client's left wrist and begins internally and externally rotating client's right arm
- Therapist's forearm contacts the pec minor muscle at the corcoid process and resists external arm rotation

Repeat for 2 - 3 minutes and reassess for improved soft tissue mobility

7. Elbow mobilization for nerve pain

GOAL: Elbow mobilization in pronation, supination & extension

LANDMARK: Humeroulnar, humeroradial, and radioulnar

ACTION:

A. Pronation Restriction

- With client's elbow flexed to 90 degrees and braced against her side, therapist's hand's pronate her forearm to first restrictive barrier
- Client gently supinates her forearm against therapist's resistance to a count of five and relaxes

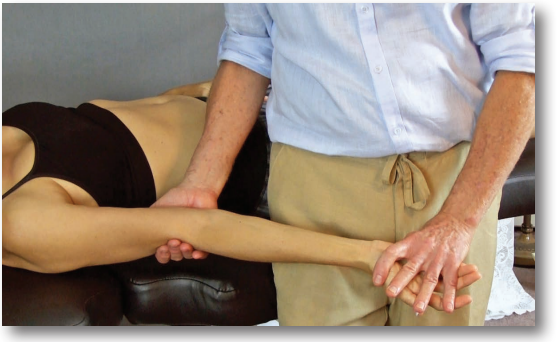
Therapist brings client's arm to new pronation restrictive barrier, repeats and reassesses for improved tissue mobility

B. Supination Restriction

- Therapist's hands bring client's forearm to first supination barrier
- Client gently pronates her forearm against therapist's resistance to a count of five and relaxes

Therapist brings client's arm to new supination restrictive barrier, repeats and reassesses for improved tissue mobility

C. Extension Restriction



- Therapist's left hand grasps client's arm above her elbow
- Therapist's grasps client's hand and supinates her arm
- Therapist applies a gentle counterforce by extending client's arm to the first extension barrier
- Client gently flexes her biceps to a count of five and relaxes

Therapist brings client's arm to new extension barrier, repeat and reassess for improved tissue mobility

LESSON 2

1. Radial Nerve Mobilization

(C5 –T1) (Radial Tunnel) (Tennis Elbow)

A. Soft Tissue Prep

ACTION:

- With client's arm horizontally abducted, therapist's left hand grasps, lifts, and slowly rotates client's arm while right hand resists by twisting her triceps
- Therapist performs a sling and resist (S & R) technique to hydrate adhesive extensor tendons at lateral epicondyle
- Therapist "duck-grips" extensor tendons while client slowly flexes and extends wrist and fingers
- Therapist's thumbs spread distally from lateral epicondyle across supinator muscle as client slowly supinates and pronates forearm

Repeat for 2 minutes and reassess for improve tissue mobility

B. Nerve Mobilization (Supine)

ACTION:

- With client's shoulder slightly off the edge of therapy table, therapist's left leg braces (depresses) client's shoulder
- The client curls her fingers around her thumb and extends elbow
- Therapist snakes his right hand under client's elbow and grasps her wrist and internally rotates her arm to the first pain free barrier
- Therapist's left hand grasps clients cupped hand and flexes and ulnarly deviates client's hand to first pain barrier
- To stretch the radial nerve, the client's arm is slowly abducted to next pain free barrier
- To further traction the nerve, the client left rotates and sidebends her neck
- To glide the radial nerve proximally, the client increases left neck sidebending and rotation while the therapist slowly extends her wrist and/or flexes her elbow
- To pull the nerve distally, she right rotates and sidebends her head as the therapist fully extends her elbow, internally rotates her arm, and flexes her wrist

Repeat this maneuver 5 times and reassess for decreased radial nerve pain

2. Ulnar Nerve Mobilization

(C7, C8, T1), Cubital tunnel

A. Soft Tissue Prep

ACTION:

- To release ulnar entrapment under the subscapularis muscle, therapist's left hand grasps client's wrist and abducts arm, while soft flat fingers of therapist's right hand contact subscapularis muscle in armpit
- As therapist steps to his left, he flexes and internally rotates client's arm so soft flat finger pads (or fist) can stretch the subscapularis
- As he steps right, the fingers are repositioned so his fingers can work all the attachments that may be entrapping the ulnar nerve
- Next, the therapist's thumbs strip up and down the flexor carpi ulnaris, while client flexes and abducts the arm and extends the wrist
- Therapist's thumbs then move up to the olecranon and thumb's strip fibrotic tissues (including pronator teres) while the client extends, abducts and brings the palm toward side of face (fingers down)
- Therapist grasps the cubital tunnel muscles while his opposite hand slings and resists (S & R)

Repeat this maneuver 5 times and reassess for improved tissue mobility

B. Ulnar Nerve Gliding Routine

ACTION:

- With therapist facing his client, his right hand grasps client's right wrist, and horizontally abducts and externally rotates her arm to 90 degrees
- Therapist's left hand snakes under and grasps / depresses the client's shoulder to stabilize
- Client's elbow is braced against therapist's hip
- The fingers of therapist's right hand radially deviate and extend client's wrist and fingers (particularly the 5th digit)
- In this position, the client right rotates / sidebends her head to gently stretch the nerve
- Therapist then uses his hip and hands to slowly abduct and depress client's shoulder a little further testing for increased nerve sensitivity

- To glide the ulnar nerve proximally, the client left sidebends her head as the therapist releases finger and wrist extension
- To glide nerve distally, the therapist increases elbow flexion, and arm and wrist pronation (goal is to place client's fingers along the side of her face with fingers facing down)
- Slowly repeat 5 to 10 times to gently floss and release entrapped nerve at the thoracic outlet, cubital tunnel, or Guyon's canal.

Repeat this maneuver 5 times and reassess,for decreased ulnar nerve pain

3. Median Nerve Mobilization

(C5 – T1) (carpal tunnel)

A. Soft Tissue Prep:

ACTION:

- With client's arm horizontally abducted, therapist's left hand grasps, lifts, and slowly internally and externally rotates client's arm while right hand resists by twisting her biceps
- Therapist performs a sling and resist (S & R) technique to hydrate adhesive pronator teres tendons
- Therapist's thumbs spread proximally and distally across the pronator teres muscle as client slowly flexes and extends her wrist

Repeat this maneuver 5 times and reassess for improved tissue mobility

B. Median Nerve Mobilization

ACTION:

- With client lying supine, therapist left hand grasps client's arm above the elbow
- Therapist's right forearm rests on table to brace the superior border of client's shoulder to stabilize
- Client's arm is abducted to 90 degrees and therapist's right hand grasps client's elbow
- Therapist's left hand grasps client's wrist and externally rotates client's arm
- Therapist's fingers grasp and extend client's thumb, index and middle fingers while supinating her wrist
- Therapist extends client's wrist and fingers and slowly begins to extend her elbow to first painful barrier
- To stretch the median nerve, the client left rotates and sidebends her neck while therapist extends and externally rotates her arm, wrist and fingers
- To floss the median nerve proximally, the client gently increases left neck sidebending as the therapist slowly flexes her elbow

- To traction the nerve distally, the therapist gently extends and externally rotates her elbow, wrist and fingers as she right sidebends her head

Repeat this maneuver 5 times and reassess for decreased median nerve pain

4. Upper body nerve entrapment home retraining

- **Radial Nerve: Waiters tip:** The client depresses her shoulder, internally rotates her extended arm and grasps thumb in palm of her hand. She flexes and radially deviates her wrist to the first painful barrier. To traction the nerve she sidebends and rotates her head to the non-painfull side. To floss the radial nerve she brings her head to neutral while slightly abducting her arm

Repeat 5 times and reassess for decrease radial nerve pain. Switch and do both sides.

- **Ulnar Nerve:** The client places hand on the side of her face and slowly rotates fingers so they're facing down. To enhance the stretch, client may sidebend away from the painful side. Also, try making a mask with your fingers turned upside down and sidebend away from the painful side

Repeat 5 times and reassess for decreased ulnar nerve pain. Switch and do both sides.

- **Median Nerve:** With arm abducted to 120º, client externally rotates her shoulder to stabilize, extends wrist and gently sidebends the head back and forth to stretch the nerve

Repeat 5 times and reassess for decrease median nerve pain. Switch and do both sides.

- **Shotgun:** With arm abducted to 90 degrees, client's extended fingers touch wall. She leans into wall with fingers pointing up (12 o'clock). She sidebends her head away from the painful side to test for nerve sensitivity. To enhance nerve stretch, client slowly begins to externally rotate her arm and hand toward 6 o'clock (fingers pointing down). To floss, the client sidebends her head toward the painful side while rotating the fingers toward 6 o'clock and then reverses toward 12 o'clock as she sidebends away from the painful side.

Repeat 5 times and reassess for decreased pain in the radial, ulnar or median nerve.

Tubes represent nerve paths

LESSON 3

1. Lumbar nerve entrapments

A. Create space in the lumbars

ACTION:

Therapist's thumb and index finger contacts both sides of the client's lumbar spine

- Fingers of therapist's other hand brace on top
- Therapist begins rocking back and forth, pushing and pulling on lumbar fascia assessing for ART (Asymmetry, Restriction of motion, Tissue texture abnormality)
- Therapist's fingers search for protective muscle guarding and release any contractures

Reassess for improved tissue mobility and switch sides

B. Iliolumbar Ligament Nerve Entrapment

ACTION:

- Therapist stands at the head of the therapy table or on client's right side
- The index finger and middle fingers of the therapist's right hand straddle the spinous processes at L4 and the index and middle fingers of the opposite hand are placed on top to form Dalton's "Flying V"
- With firm extensor forearms and extended elbows, the therapist leans his body weight and begins digging into the iliolumbar ligaments
- A jolting action is added (coming from the ground) that helps drive the extended fingers down to L5-S1 to scrub the fibrotic ligaments

Repeat 2 - 3 minutes and reassess for improved iliolumbar ligament mobility

Note: *Try using thumbs or knuckles if you're having trouble with extended fingers*

C. Freeing the lumbars

ACTION:

- Therapist stands at the head of the therapy table or on client's right side
- Therapist's left hand braces the sacrum, and his right palm contacts the lumbar spine
- A counterforce occurs as the therapist pushes with his left hand and resists with his right
- Therapist's hands mobilize the sacrum and lumbars in a variety of directions

Reassess for improved tissue mobility and switch hands

2. Sacrospinous Nerve Entrapment

A. Sacrotuberous – Sacrospinous release

ACTION:

- Therapist's thumbs come under the gluteal fold to contact the sacrotuberous/sacrospinous ligaments on the contralateral side
- Client is instructed to perform slow pelvic tilts while therapist's thumbs release fibrotic sacrospinous ligaments that man be entrapping the sciatic nerve

Work each side for 2 minutes and reassess for improved ligament mobility

Note: Always work through draping or underwear when performing this technique

B. Piriformis entrapment

ACTION:

- Client prone and knee flexed to 90 degrees
- Therapist places a flat forearm as close to the sacrum as possible and positions his body so he can internally and externally rotate client's with opposite hand
- Therapist hooks the tissue along the sacrum and drags it cranially and caudally while externally and internally rotating client's leg
- Therapist's elbow palpates for protective sciatic muscle guarding and gently compresses the area while internally and externally rotating client's femur

Repeat for 2 - 3 minutes and reassess for improved piriformis mobility... switch sides

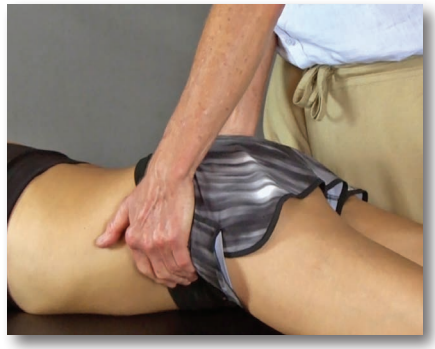
3. Iliosacral Alignment Technique

(anteriorly-inferiorly rotated left ilium)

GOAL: Restore pelvic alignment & level the sacral base

LANDMARK: Left ASIS and Right PSIS

ACTION:



- Therapist stands on client's right side and reaches across with both hands and grasps client's left ASIS.
- Therapist's soft relaxed left palm cups client's left ASIS.
- Using the palm of the right hand, therapist contacts client's right PSIS.
- With both elbows extended, therapist pulls with his left palm and resists with his right to improve nerve mobility at the iliosacral joint

Repeat 5 times... reassess for improved iliosacral alignment.

---

4. "Jelly-Roll"

To mobilize fibrotic lumbar muscles and ligaments

ACTION:

- Client's arms grasp knees and pull to her chest (pain free)
- Therapist's uphill forearm braces on top of client's knees
- Therapist rolls the client into trunk flexion allowing his opposite hand to come under and grasp client's sacrum or lumbar vertebrae
- Therapist uses both arms to rock client into more flexion as he drags on the sacrum to decompress the lumbar vertebrae

Slowly rock for 2 - 3 minutes and reassess for improved lumbar mobility

Note: *Discontinue and try later if the client reports sciatic nerve pain during trunk flexion (this is a mobilization and also a test)*

5. Sciatic Nerve Mobilization

(including gluteal and pudendal nerves)

ACTION: Left sidelying with thorax and lumbars flexed (therapist faces client)

- Therapist hands grasp client's right ankle and flex client's knee and hip to 90 degrees
- Therapist steps behind client's flexed knee so that his right hand grasps and dorsiflexes client's ankle
- Therapist slowly extends client's knee to first painful sciatic barrier
- To traction sciatic nerve, client tucks chin as therapist introduces knee extension and foot dorsiflexion to barrier
- To floss sciatic nerve distally, client releases chin tuck as therapist gently extends knee and dorsiflexes foot to the new barrier
- To floss proximally, client chin tucks as therapist slowly flexes her knee

Repeat this pain-free nerve flossing technique 5 - 10 times and reassess for reduced sciatic nerve pain. Repeat on opposite side.

Note: *To manually floss the sciatic nerve, therapist left hand can grasp client's head and flex and extend as he extends and flexes client's knee*

---

6. Peroneal & Tibial Nerve Stretching (supine)

A. Sciatic (Straight Leg Raise)

ACTION:

- Standing on client's left side, therapist's left hand crosses on top of client's thigh above the knee and flexes her hip to allow his right hand to come under and grasp her left foot
- Therapist's shoulder and arms flex client's hip and knee to first restrictive barrier
- Therapist's right hand dorsiflexes client's ankle while slowly extending client's knee to painful or restrictive barrier
- Client is asked to tuck her chin to painful barrier to traction and stretch sciatic nerve
- To floss distally, client releases chin tuck as therapist increases knee extension and foot dorsiflexion.

- To floss proximally, client tucks chin as therapist slowly flexes her knee

Repeat this pain-free nerve flossing technique 5 - 10 times and reassess for reduced sciatic nerve pain. Repeat on opposite leg

B. Peroneal Nerve Mobilization

(shin splints)

- Therapist begins the SLR technique above but adds foot supination and ankle inversion to isolate the peroneal nerve

Repeat this pain-free nerve flossing technique 5 - 10 times and reassess for reduced peroneal nerve pain. Repeat on opposite leg

C. Tibial Nerve Mobilization

(plantar fasciitis)

- Therapist begins the SLR technique above but adds foot pronation and ankle eversion to isolate the tibial nerve

Repeat this pain-free nerve flossing technique 5 - 10 times and reassess for reduced tibial nerve pain. Repeat on opposite leg

Note: *To mobilize smaller sciatic nerve branches such as the pudendal, superior and inferior gluteal nerves, therapist performs the same technique but adds internal and external femoral rotation as an enhancer.*

7. Femoral Nerve Mobilization

(L2- L4) (left sidelying)

ACTION:

- Client uses both hands to grasp her left knee and bring it in to knee and hip flexion
- Therapist's left hand grasps client's right ankle and his right hand grasps her knee
- Therapist steps behind client's knee as it is brought into flexion
- With right hand on her knee and his left securing her ankle, the therapist can create knee flexion or hip extension
- Therapist gently extends client's hip to painful femoral nerve barrier and backs off to the inter-barrier zone
- The client tucks her chin to traction the femoral nerve
- To floss the nerve distally, the therapist gently adds knee flexion as the client brings her head back to neutral

- In hypermobile clients, the therapist removes his left hand from ankle and places it on client's hip
- A counterforce is created as the therapist extends clients hip by pulling with is right hand and resisting with his left
- Knee flexion can also be added if needed

Repeat this pain-free nerve flossing technique 5 - 10 times and reassess for reduced femoral nerve pain. Repeat on opposite leg

---

8. Obturator Nerve Mobilization

(L2- L4) (prone)

ACTION:

- Therapist flexed client's knee to 90 degrees
- Therapist places client's arch in his armpit
- Therapist lifts client's knee so his right hand can snake around and grasp her knee
- Note: use alternate technique if your arm isn't long enough
- Therapist slowly extends, internally rotates and abducts client's hip to barrier and backs off to inter-barrier zone if pain is felt in the adductor muscles
- Therapist brings the leg back to neutral and repeats the internal femoral rotation, hip extension and abduction

Repeat this pain-free nerve flossing technique 5 - 10 times and reassess for reduced obturator nerve pain. Repeat on opposite leg

9. Lower body nerve entrapment home retraining

A. Seated Slump Test (SST)

ACTION:

- Seated client slumps forward at the thoracic and lumbar spine. If this position caused no pain, have the client flex the neck by placing the chin on the chest and then extending one knee as much as possible.
- If extending the knee causes pain, have the client extend the neck to neutral. If the client is still unable to extend the knee due to pain, the test is considered positive.
- If extending the knee does not cause pain, ask the client to actively dorsiflex the ankle. If dorsiflexion causes pain, have the client slightly flex the knee while still dorsiflexing.
- If the pain is reproduced, the test is considered positive.

Repeat this seated sciatic nerve slump test 10 times Assess for reduced sciatic nerve irritability. Repeat with other leg.

Note: *Therapist applied over-pressure can be applied during any of the test positions.*

B. Sciatic …Straight Leg Raise (SLR)

ACTION:

- Client places a rope or Theraband strap around arch of foot and brings extended leg to first painful hip extension barrier and backs off to the interbarrier zone.
- To traction the sciatic nerve, she flexes her neck and dorsiflexes her foot.
- To floss the nerve, she extends her neck and increases hip extension.
- To floss headward, she flexes her neck while slowly plantar flexing her foot.

Repeat this sciatic nerve flossing technique 10 times and reassess for reduced sciatic nerve irritability Repeat on opposite leg

C. Peroneal Nerve Mobilization (shin splints)

ACTION:

- Client performs the same SLR technique above
- Client supinates and inverts her ankle to isolate the peroneal nerve
- Client flexes hip to the first painful barrier and backs off
- Client begins raising and lowering her head to floss

Repeat this sciatic nerve flossing technique 10 times and reassess for reduced sciatic nerve irritability
Repeat on opposite leg

D. Tibial Nerve Mobilization (plantar fasciitis)

ACTION:

- Client performs the same SLR technique above
- Client pronates and everts her ankle to isolate the tibial nerve
- Client flexes hip to the first painful barrier and backs off
- Client begins raising and lowering her head to floss

Repeat this sciatic nerve flossing technique 10 times and reassess for reduced sciatic nerve irritability Repeat on opposite leg

E. Femoral Nerve

ACTION:

Client begins on her knees and flexes the hip on her non-painful side up to allow her leg to come in to a 90-90 position.

- Keeping her pelvis level, she slowly begins leaning forward as if she were stretching the quadriceps on her affected leg.

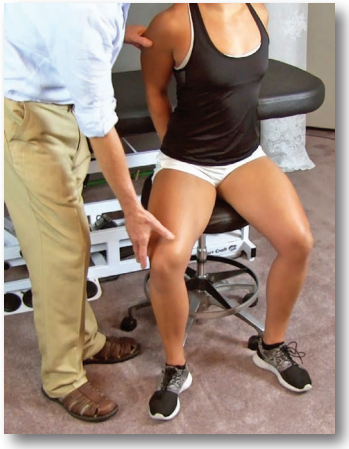
- As soon as she begins to feel the nerve pain in the quads, she backs off to the interbarrier zone and tucks her chin to increase femoral nerve sensitivity.
- To stretch the nerve, she simply leans forward.
- To floss distally, she returns her head to neutral while increasing hip extension.
- To floss proximally, she chin tucks while slowly returning her hips back to neutral (hip flexion).

Repeat this sciatic nerve flossing technique 10 times and reassess for reduced sciatic nerve irritability. Repeat on opposite leg

F. Obturator Nerve

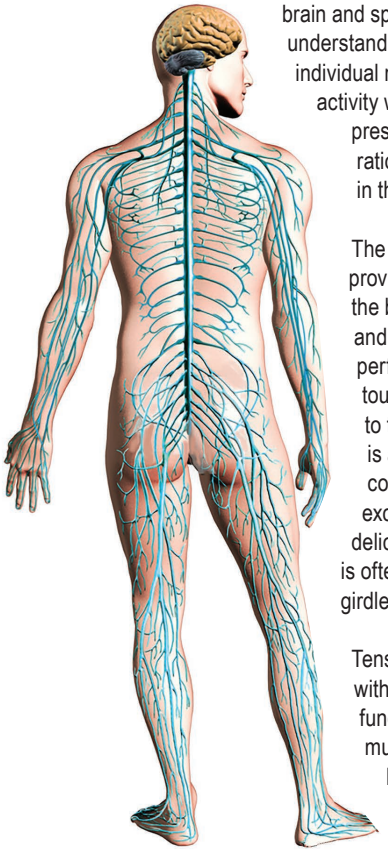
ACTION:

- Seated client places her arms behind her back and grasps her wrist to prevent slumping.
- Client brings her affected leg into abduction to painful barrier (sensitivity in the groin).
- To stretch the obturator nerve, client flexes her chin and abducts her leg.
- To floss proximally, she adducts her leg and increases neck flexion.
- To floss distally, she extends her neck and increases hip abduction.



Repeat this sciatic nerve flossing technique 10 times and reassess for reduced sciatic nerve irritability Repeat on opposite leg

Bones Dominate - Muscles Accommodate - Brain Regulates



Any alteration of joint function is carefully monitored by the brain and spinal cord and may influence muscular function. To understand the fine control of motion, the separate activity of individual muscles is not as important as their coordinated activity within the different movement patterns. This course presents concepts that appear as the best basis for rational treatment and good long-term therapeutic results in the general population.

The shoulder girdle functions to position the hand, provides stability for hand use, lifts, pushes, elevates the body, assists with forced inspiration and expiration, and even weight bearing as in crutch-walking. The hand performs a significant range of functions. It is an organ of touch, an extension to the brain that provides information to the visual system about the environment, and it is an important organ for expression and nonverbal communication. The hand can grasp with forces exceeding 100 pounds as well as hold and manipulate a delicate thread. Unfortunately, optimal hand functioning is often jeopardized by problems occurring in the shoulder girdle, elbow and wrist.

Tension, trauma, and repetitive movements combined with gravitational exposure alter the position and function of associated joints. Mobilizing joints through muscle manipulation is a key factor in the success of MAT. Therefore, soft tissue maneuvers have been developed to release osseous fixations, relieve protective spasm and improve nerve gliding through all the body's synovial joints.

Active movement psychologically reinforces to a client that she can move the arm through a greater range of motion. This is called stretch tolerance. Physiologically, active movement assists the healing collagen tissue to align itself along normal stress lines and aids in restoration of normal strength. Active movement also nourishes articular cartilage and enhances its repair. Continual re-evaluation of motion progression is valuable to provide clients with short-and long-term goals. This also gives the clinician feedback about compliance with home exercise programs which includes TheraBand® strengthening tools and specific stretching modalities.

You will not be tested on the supplemental articles, they are for your further education

Neurogenic Thoracic Outlet Syndrome (NTOS)

Humans are not well adapted as beasts of burden and heavy loads hung from the shoulders and arms can really stress shoulder girdle support structures. Since the weight of the scapula and arm takes its support from the clavicle and its component ligaments and muscles, occupations requiring repetitive overhead arm movements can produce symptoms of compression. Electricians, painters, dancers and competitive athletes such as swimmers and pitchers may develop hyperabduction syndrome due to excessive frictioning of neurovascular structures in the shoulder and brachial region. The generic term 'thoracic outlet syndrome' (TOS) is often used to describe a variety of symptoms associated with this and other shoulder impingement syndromes.

TOS is a controversial topic in the literature; many proponents support the existence of the condition, but some strongly vocal opponents doubt the validity of TOS as a medical entity.

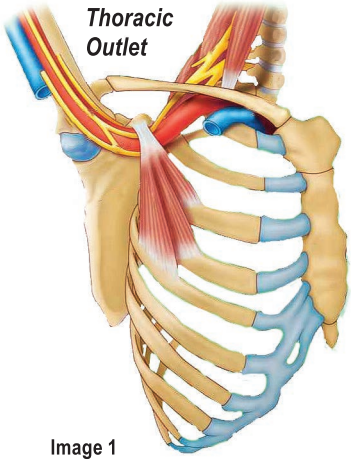


Image 1

The primary controversy seems to center around the lack of universally reliable assessments and the confusion with multiple types and clinical presentations. Fortunately, new MRI scanning technology available in many major USA hospitals is now able to accurately identify and localize TOS and other nerve entrapment syndromes. Researchers at Cedars-Sinai Medical Center, the University of California, Los Angeles, and the Institute for Nerve Medicine in Los Angeles, have developed a new nerve imaging technology called 'Magnetic Resonance Neurography' which has proven extremely effective in implicating sites of peripheral nerve damage[1].

TOS involves compression, injury, or irritation to neurovascular structures at the root of the neck, upper thoracic region, or beneath the pectoralis minor muscle. Compression syndromes at these sites are primarily neurologic and involve the brachial plexus—most often the lower trunk or medial cord. Additionally, the subclavian artery and vein may also be compromised. Cervical nerves and vessels often become trapped between fibrotic anterior and middle scalene tendons as they enter the thoracic inlet (Image 1.). Prolonged scalene spasm from injury or overuse can also cause problems

as they tug on the first rib pulling it up against a 'drooping' clavicle. When the brachial plexus gets squashed between the clavicle and rib, a condition known as costoclavicular syndrome arises. This disorder is one of the leading causes of TOS.

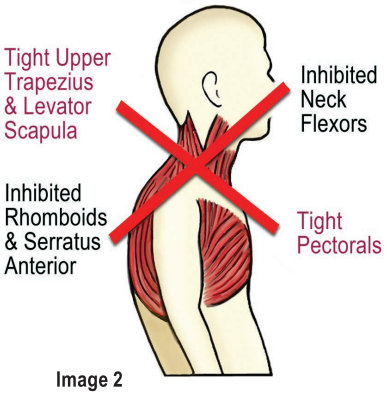

Tight Upper Trapezius & Levator Scapula
Inhibited Neck Flexors
Inhibited Rhomboids & Serratus Anterior
Tight Pectorals

Image 2

Upper Crossed Syndrome

Commonly seen muscle imbalance patterns such as Vladimir Janda's upper crossed syndrome (Image 2) play a major role in the formation of entrapment neuropathies. As tight pectoral muscles roll the shoulder girdle forward on the ribcage, the clavicles drop onto the first thoracic rib causing brachial plexus compression. Anterior displacement of the humeral head (tight pecs and lats) is also an area of impingement associated with upper crossed patterns. Fortunately, many illusive TOS cases are easily corrected using structural integration techniques such as those shown page 9. Successful long-term alleviation of pain, numbness, swelling, and paresthesias associated with this troublesome disorder requires that all upper quadrant postural asymmetries (slumped shoulders, forward heads, hyperkyphosis, etc.) be corrected prior to releasing smaller 'impinging' muscles such as intertransversarii, scalenes, and subclavius.

Below is a summary of component syndromes which comprise thoracic outlet syndrome along with a brief description of each.

- **Intertransversarii fibrosis:** Consisting of rounded muscular and tendinous fasciculi running from anterior and posterior tubercles of the transverse processes of two contiguous vertebrae, reflex spasm from cervical joint fixations or facet 'spurring' (Image 3) causes them to tighten and squeeze on spinal nerve roots. An often neglected site of nerve root compression, these tissues are usually easy to release using contract/relax stretching techniques shown in my Myoskeletal Shoulder, Arm and Hand videos.
- **Anterior scalene tightness**: Compression of the interscalene space between the anterior and middle scalene muscles frequently causes reflex spasm. This condition is primarily due to long-term nerve root irritation from spondylosis or facet joint inflammation.
- **Costoclavicular approximation**: Postural deficiencies and carrying heavy objects results in neurovascular compression in the space between the clavicle, first rib and musculoligamentous structures.
- **Pectoralis minor tightness:** Repetitive movements of the arms above the head (shoulder elevation and hyperabduction) frictions and irritates the nerve plexus between the pectoralis minor tendon under the coracoid process.

Double-Crush Syndromes

Simply stated, 'double crush' means that if any given nerve is subjected to a proximal compressive neuropathy then it is more prone to the development of a second or 'double' distal neuropathy. Double crush syndrome was first described in the medical journal 'Lancet' in 1973. The term refers to a diagnosis of a compressed or trapped nerve in one area (e.g. the neck or thoracic outlet), with a second entrapment in another location (e.g. the carpal tunnel or Guyon's tunnel in the elbow), with both entrapments contributing to symptoms. Some researchers suggest that the presence of an undiagnosed entrapment in another location may explain why some people still experience symptoms after carpal tunnel surgery. This has led manual therapists to question if examination of the hand alone is sufficient when dealing with syndromes such as carpal tunnel. Therapeutic outcomes are more successful when the nerves along the entire length of the arm are examined beginning proximally from the cervicothoracic spine down through the wrist and hand.

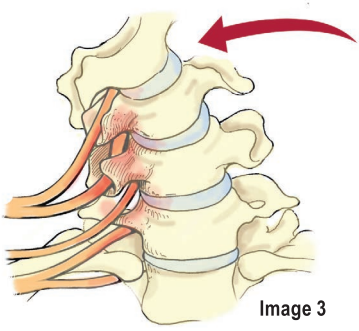


Image 3

Summary

Because the shoulder and neck area consist of very complex body parts with muscles and connective tissues going in all possible directions, therapists must focus intent on correcting postural strain patterns prior to 'chasing the pain'. A few commonly applied provocation tests for assessing TOS such as the Adson maneuver (scalenes), 'Hands-up' (pec minor), Allen (radial pulse) and the Elevation maneuver for costoclavicular canal impingement may be used. These tests may or may not momentarily reproduce symptoms but are sometimes helpful in ruling out other causes which may produce similar symptoms.

Due to the overlapping of symptoms, it's often difficult to make a definitive assessment using provocation tests. Fortunately, advancements in nerve imagery using Magnetic Resonance Neurography are providing more accurate monitoring of exact sites of peripheral nerve damage. These tests, accompanied by thorough history, postural evaluation and properly applied nerve mobilization techniques such as those demonstrated in this "Treating Trapped Nerves" course, are extremely helpful in restoring function while preventing the formation of adhesions that trap and irritate nerve bundles that brings sensation to the arm and hand.

References

Filler A., Haynes J, Jordan S, Prager J, Villablanca J, Farahani K, McBride D, Tsuruda J, Morisoli B, Batzdorf U, *Johnson J, Journal of Neurosurgery,* 2005, pp.99-115

Articular Stretching for Neural Mobilization

A primary part of being human is the ability to use our hands in extraordinary ways. This effective and skillful hand use requires stable and painless movement of all upper extremity joints, including the elbows. Since the elbow bends and straightens much like a basic door hinge, it is referred to as a hinge joint (Image 1). However, the interaction of the elbow with the forearm and wrist is far from basic. When this complex interaction is fully understood, it's easy to see how dysfunctional elbow mechanics could be a major contributor to forearm and hand pain.

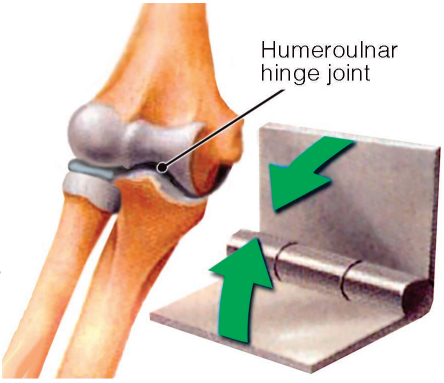


Image 1: The humeroulnar is the only true elbow hinge joint.
Adapted from Dreamstime

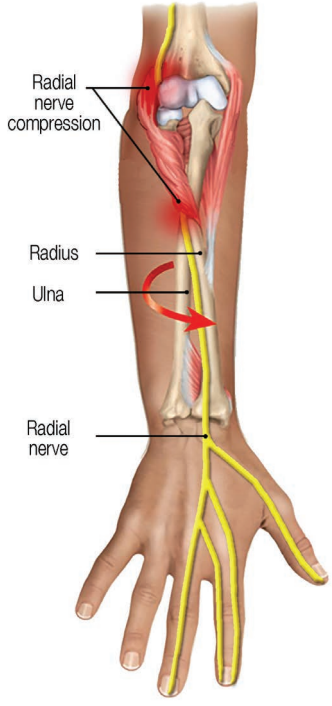


Image 2: the elbow's radio head smoothly rotates around the ulnar bone.
Adapted from McGraw Hill with permission

Epicondylalgia

While the humeral and ulnar bones flex and extend similar to a door hinge, the humeral and radial articulations are much more complex. Shaped like a contoured knob with a cup at the end, the elbow's radial head smoothly rotates around the ulnar bone, causing the radiohumeral and radioulnar joints to efficiently turn the palm up (supination) or down (pronation) (Image 2). Sports—and occupations that involve repetitive lifting, forceful forearm maneuvers, and recurrent vibration—may, in time, damage the elbow's extensor tendons and degrade the joint's articular cartilage. In the presence of altered joint mechanics, the brain may decide to layer the area with protective spasm, resulting in radial nerve symptoms that resemble lateral epicondylalgia, or tennis elbow. Famed hand surgeon Emanuel Kaplan, MD, was the first to suspect radial nerve denervation as a possible cause for some epicondylalgia cases. In dissection studies, he noted constriction of the radial nerve by adhesions to the capsule of the radiohumeral joint and the short extensor muscle of the wrist.[1] A study published in Manual Therapy Journal found that a significant percentage of double-blind subjects presenting with tennis elbow demonstrated a favorable response to articular stretching techniques to restore optimal extension, pronation, and supination.[2] A similar study on computer users found immediate reduction in lateral elbow pain after radial nerve mobilization.[3]

The researchers concluded that mobilization with movement appears to be a promising alternative treatment for clients with tennis elbow.
But why?

Tendinosis or Nerve Pain?

Most of us who treat athletes are keenly aware that repetitive gripping can strain elbow tendons, leading to palpable maladaptions in tendon structure. During clinical examination of tennis elbow, clients often report tenderness over the common forearm extensor tendon insertion at the lateral epicondyle.

Pain is reproduced with resisted wrist and middle finger extension and with gripping activities. I've had success treating this tendinopathy using cross fiber frictioning and eccentric strengthening exercises. However, I've had better results when the treatment included articular stretching routines to help calm hyper excited mechanoreceptors, reduce protective muscle guarding, and remove tension on strained fibers and compressed nerve tunnels.

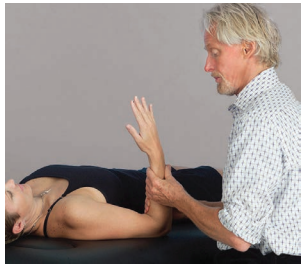


Image 3: With the elbow pinned to the clients side, the forearm is rotated to the first supination barrier. The client gently pronates the arm against resistance to a county of five and relaxes. I supinate to the next restrictive barrier and repeat until full supination is reached.

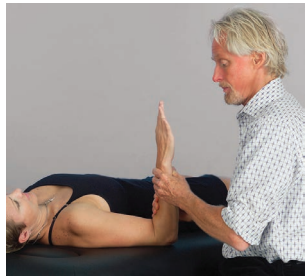


Image 4: The forearm is rotated to the first pronation barrier and the client gently supinates against resistance to a count of five and relaxes. I rotate to the next restrictive barrier to a count of five and releases. I rotate to the next restrictive barrier and repeat until full pronation is achieved.

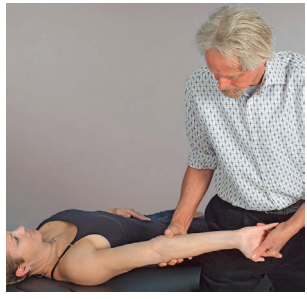


Image 5: the client's elbow is extended to the first restrictive barrier. The client gently flexes the biceps to a count of five and relaxers, and I bring her elbow to the first extension restriction barrier. Repeat until full elbow extension is achieved.

adapted from Dreamstime

Image 6: The client extends the elbow and curls the fingers around the thumb. She Internally rotated the scapula, and left sidebands her head. To enhance the nerve flossing stretch, she slowly abducts her arm and reaches toward the floor. Repeat daily.

Try incorporating the myoskeletal articular stretching techniques for elbow supination, pronation, and extension shown in Images 3, 4, and 5 prior to assessing and treating soft-tissue lesions. If your state laws allow home retraining advice, teach the radial nerve mobilization stretch shown in Image 6. You may find that many chronic elbow and forearm problems soon disappear as full mobility is restored to motion-restricted joints and associated soft tissues.

Using Bone as Levers to Mobilize Muscles

As a fan of Vladimir Janda's provocative body of work, I have highlighted his research throughout my teachings and hopefully integrated his wisdom into mainstream bodywork. I've written extensively on aberrant postural patterns associated with his infamous upper crossed syndrome, such as a protruding neck, rounded shoulders, kyphotic t-spine, jutted chin, hyperextended O-A joint, and internally rotated arms (Image 1). Yet one overshadowed gem of Janda still exists- the humble pain generator deeply hidden within his upper crossed pattern –The Fixated First Rib.

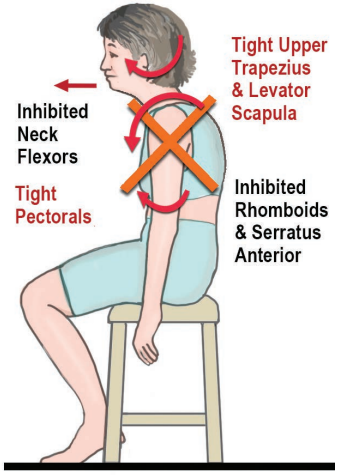

Tight Upper Trapezius & Levator Scapula
Inhibited Neck Flexors
Tight Pectorals
Inhibited Rhomboids & Serratus Anterior

Image 1: Courtesy of Craig Liebenson from Dynamic Body

Symptoms of a first rib fixation range from head, neck, jaw and shoulder pain, to breathing difficulties and arm numbness. The first rib is a relatively unstable structure that acts as the attachment site for several muscles including the scalenes. In the upper cross forward head carriage, the scalenes can often become hypertonic and exert an upward pull on the rib (Image 2). In chronic cases, the first rib can become so "jacked up" (fixed in inhalation) that it is painfully frozen into inaction. Thus, the stage is set for possible brachial plexus compression and accompanying thoracic outlet syndrome that leads some naïve and pained individuals to opt for surgical removal of the first rib.

Assessment and Treatment Options

Ninety percent of fixated rib assessment can be determined from the client's history. The palpation exam that follows will typically confirm the client's history findings. Make it a routine to examine lifestyles leading to episodic injuries. Give full attention to the "mundane" such as sleeping habits, work demands, computer hours, posture, and all injuries from the innocent to the life-changers. Like family genetics or nurture vs. nature idiopathies, the body is literally a manifestation of its imbalance, either subconsciously through subtle movement patterns, to traumatic body game changers.

Elevated first ribs commonly occur in the stomach-sleeping population or those who sleep with one arm tucked under their head. Extensive computer work with poor mouse ergonomics may hyperexcite cervicothoracic joint and ligament mechanoreceptors adding to the distressed upper crossed muscle imbalance pattern. These people typically complain of constant dull, aching pain and tightness in the upper shoulder girdle. Additionally, many whiplash-type injuries have first rib involvement. Tennis players, golfers and weight lifters seem most susceptible to neurovascular compression from first rib fixations.

To assess, simply stand or sit behind the supine client, and with soft finger pads, grasp the anterior aspect of the upper traps and gently pull posteriorly (Image 3). With the upper traps retracted, allow your fingers to wade through the tissue searching for the bony feel of the superior shaft of the first rib. Ask for a deep inhalation and let your fingers resist any upward movement produced by the scalenes. If the rib does not rise during deep inhalation efforts, it could already be elevated and stuck. To test, palpate bilaterally by gently springing the rib inferiorly and observe for motion dysfunction. Check for areas of tenderness, ipsilateral scalene hypertonicity, and pain upon exhalation. Both pain and asymmetry can indicate first-rib dysfunction. During palpation, expect some swelling and tenderness in the upper trapezius area. Chronic cases can result in self- guarding due to myospasm. Assure your clients that this "jump sign" is a typical response to the "touchy" fixated rib and encourage their feedback. Address any of their concerns as you work this highly sensitive area.

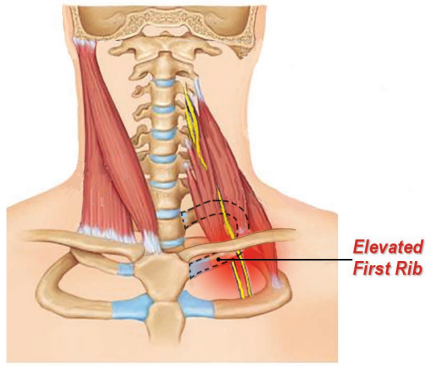


Image 2

Image 3

Research findings are definitely lagging behind the success of the bodyworker's hands-on treatment. Regardless of scant scientific clinical trials, utilizing various manual therapy techniques, such as those shown in Mike's treatment video below will usually relieve the symptoms. First rib fixations are painfully exhausting and interfere with one's quality of life, so bodyworkers are encouraged to "mine out" this hidden pain generator and assist the client in their journey "to take a deep breath and smell the roses."

Remember to integrate the myoskeletal mantra of using ***"bones as levers to mobilize muscles."*** Release spastic soft tissues as part of a comprehensive rehab program, and boost overall body function to new levels by incorporating corrective exercises. (a demonstrated by Paul Kelly in our Motion is Lotion video set) Ideally, the bodyworker is taxed with balancing upper cross muscles prior to staving off any subtle hint of rib dysfunction. As Vladimir Janda beautifully observed, ***"If you chase pain, you will forever be lost."***

Carpal Tunnel Syndrome Revisited

Adding Nerve and Joint Gliding Routines

Artists, bodyworkers, computer programmers, and writers are among those who suffer from overuse syndromes such as carpal tunnel syndrome (CTS).Although most of us have developed hands-on skills for relieving median nerve compression as it passes under the transverse carpal ligament, I believe the treatment can be enhanced (image 1).

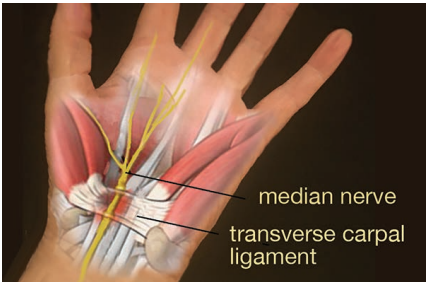


Image 1: The relationship of the median nerve and the carpal tunnel ligament

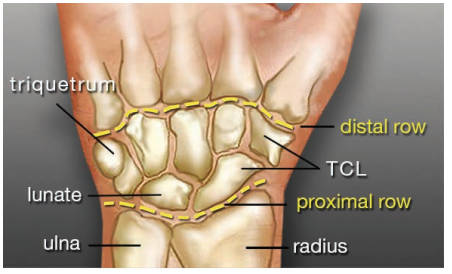


Image 2: The proximal carpal row includes the scaphoid, lunate, and triquetrum

By adding simple nerve and joint gliding techniques, inflammation, which arises as tendon and nerve sheaths glide across rigid carpal bones, is often reduced.

A 2015 study published in The Journal of Pain reported physical manual therapies that included central nervous system desensitization maneuvers were effective in improving CTS pain.[1] By restoring proper carpal joint positioning, massage helps lower intra-tunnel pressure and boosts median nerve glide. I've found gentle carpal stretching facilitates longitudinal nerve excursion and reduces protective guarding in the arm flexor muscles. To test this hypothesis, let's first assess and correct the most common carpal bone fixation (lunate), get the median nerve gliding, and retest.

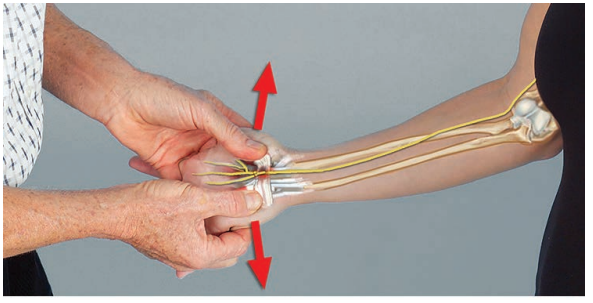


Image 3: With the client's elbow and wrist slightly flexed (palm up), the fingers of therapist and client interlace. The therapist's thumbs glide superiorly until they bump into the radius and ulna bones, and move slightly medially to contact the triquetrum and scaphoid. Holding mild sustained pressure, the client palmar-flexes the wrist against the therapist's resistance to a count of five and then relaxes. The therapist gently extends the client's wrist while his thumbs spread the triquetrum and scaphoid laterally to open the tunnel and drag the lunate away from the median nerve. Repeat 3–5 times

ADDRESSING LUNATE-TRIQUETRUM-SCAPHOID MOBILITY

Of the eight carpal bones, the lunate is notoriously the most problematic. It's prone to sticking (Image 2), and researchers have discovered that during falls or motor vehicle accidents with the hand outstretched, the lunate can dislocate, compress the flexor tendons, and occlude the median nerve.[2] Several orthopedic tests are beneficial in identifying motion-restricted wrist and hand joints, but let's focus on a single neurological exam I've found effective.

To begin, ask the client to touch the tip of the fourth digit to the thumb and hold firmly, as you moderately attempt to pull these fingers apart, testing the non-affected hand first. Weakness in the ring finger's opposition to the thumb usually indicates a triquetrum-lunate fixation. Conversely, weakness when testing the third digit's opposition to the thumb incriminates the lunate-scaphoid joint. The osteoligamentous stretches shown in Images 3 and 4 are designed to correct lunate fixations. I encourage you to add these stretches to your current CTS repertoire.

Image 4: To create space between the proximal carpal row and the radius/ulna, the therapist extends and gently tractions the elbow and wrist up to, but not entering, the painful barrier. With the therapist's thumbs positioned on the proximal carpal row, the client slowly palmar-flexes the wrist against the therapist's resistance to a count of five, and then relaxes. The therapist's fingers extend the wrist and traction the arm with the intent of spreading the tunnel, gliding the carpals free of the radius/ulna, and stretching the median nerve. Repeat 3–5 times, and then retest the ability of the third and fourth digits to oppose the thumb.

Image 5: The therapist abducts and externally rotates the client's arm to 90/90 position. The client is asked to depress and retract her scapula and hold it there. The therapist supinates the client's arm and extends the fingers and wrist. The therapist slowly begins to extend the client's elbow until discomfort occurs. The client left sidebends her head as the therapist adducts her arm to reduce stretch off the nerve. As she brings her head back to neutral, the therapist again extends and externally rotates her arm, wrist, fingers, and elbow. Slowly repeat the back-and-forth nerve flossing until symptoms improve. The therapist abducts and externally rotates the client's arm to 90/90 position. The client is asked to depress and retract her scapula and hold it there. The therapist supinates the client's arm and extends the fingers and wrist. The therapist slowly begins to extend the client's elbow until discomfort occurs. The client left sidebends her head as the therapist adducts her arm to reduce stretch off the nerve. As she brings her head back to neutral, the therapist again extends and externally rotates her arm, wrist, fingers, and elbow. Slowly repeat the back-and-forth nerve flossing until symptoms improve.

RESTORING CTS NERVE GLIDE

When swollen tendon sheaths and fixated carpals crowd out the median nerve, loss of axoplasmic nutrient flow can trigger chronic inflammation, as well as pain, if the brain feels the injury is a functional threat. A variety of active and passive neural glide techniques exist to help clients with CTS pain, but the flossing routine shown in Image 5 is my favorite. When performing this neurodynamic maneuver, the order of joint positioning is crucial. Begin by stabilizing the shoulder (scapula), followed by the forearm, wrist, fingers, and elbow.

In this order, each joint-positioning component is added until mild pain is provoked. Therapeutic nerve flossing occurs as the therapist slowly releases the client's elbow extension (slackening the nerve) while the client sidebends her head to the opposite side (tractioning the nerve). As the routine is repeated, the client's head returns to neutral (slackening the nerve) while the therapist extends the elbow to stretch the nerve back through the tunnel. Play with this maneuver until you determine the best angle for maximum tractioning.

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1. C. Fernández-de-Las Peñas et al., "Manual Physical Therapy Versus Surgery for Carpal Tunnel Syndrome: A Randomized Parallel-Group Trial," *The Journal of Pain* 16, no. 11 (November 2015): 1087–94.
2. Eren Cansü et al., "Neglected Lunate Dislocation Presenting as Carpal Tunnel Syndrome," *Case Reports in Plastic Surgery and Hand Surgery* 2, no. 1 (January 2015): 22–24, doi:10.3109/23320885.2014.993397.

About the Author:

In 1998, Erik Dalton, Ph.D., founded the Freedom From Pain Institute and developed the Myoskeletal Alignment Techniques (MAT). The MAT program addresses the need for a more integrative perspective on pain science as it applies to the human body. Developed as a tool to help relieve our nation's neck/ back pain epidemic, MAT incorporates muscle-balancing techniques and joint-stretching maneuvers. This system allows manual therapists to quickly identify and correct dysfunctional neurologically driven strain patterns before they become pain patterns.

Dalton's broad therapeutic background in massage, Rolfing and osteopathy is taught worldwide through pain-management workshops and home-study courses. In 2009, Erik Dalton was inducted into the Massage Therapy Hall of Fame, and in 2012, he received the One Concept Lifetime Achievement award. He resides in Oklahoma City, Oklahoma and Santiago, Costa Rica with his wife Teri and their two overly optimistic dogs.

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